Injury Incidence among Urban Native Americans within Maricopa County, Arizona.

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Research Hypothesis:

There are no previously published, population-based, comparative injury studies conducted in metropolitan Phoenix about Native Americans. This study was undertaken to determine if urban Maricopa County Native Americans have different minor- and severe-injury and death patterns than do rural Indians residing in the same geographic metropolitan location.

Methods:

A two-year (CY1995-CY1996) retrospective review of medical records and death certificates was conducted to test the hypothesis, and to identify the causes of urban Indian injury and death in Native American communities in Maricopa County, Arizona. 1995 US Census, 1995-6 IHS User population, Arizona Department Health Services Hospitalization Discharge 1995-6 data, and death certificate data obtained from the Arizona Department of Vital Statistics were used to compute community injury incidence, hospitalization, and crude and age-adjusted death rates for comparison of urban and rural populations in Maricopa County. Injury rates were matched against codes taken from the International Classification of Diseases - Adapted E codes (ICD-9-CM E800-969). Urban residence classification was based upon a metropolitan statistical area (MSA) definition of urban area population of at least 100,000. Mortality indicators from urban Indian residents were classified as urban based on the community where the Native American was resident at the time of death/injury, and these rates were compared to similar rates from the non-urban communities within which Native Americans resided for the study period.

Findings:

This research studied the nature of injury and mortality based on community of residence. IHS estimates that race mis-classification in Arizona is less than 3%, the second lowest in the United States. During this study period, 49,054 Native Americans reside in Maricopa County in 13 urban and 40 non-urban communities, including 4 federally recognized reservation communities. 73% of the Native Americans in Maricopa County are urban residents. 76% of the Native Americans reside in off-reservation communities. Six research areas were studied to compare urban Native American trauma incidence to rural Native American trauma incidence which occurred in the same general geographic area (i.e.: metropolitan Phoenix, Arizona). These research areas included:

1. Incidence of hospital visits for ambulatory care (minor trauma), and hospitalization (major trauma) at the Phoenix Indian Medical Center:

Hospital ambulatory care visits for minor trauma is infrequently reported in the literature. The Phoenix Indian Medical Center is the primary provider of ambulatory care for Native Americans in Phoenix with over180,000 outpatient visits during 1996. Based on E-coding, a total of 21,914 minor trauma visits were documented. Rural Indians had a total incidence rate of outpatient visits greater than urban Indians (461.2 vs. 441.4 per 1,000 population). The leading causes of the rural Indian minor trauma injury included falls, environmental factors, and other accidents. Urban Indians had higher minor trauma incidence rates than Rural Indians for motor vehicle accidents, pedal-cycle injuries, poisoning, fire/thermal injuries, submersion accidents, suicide/self inflicted injury, and homicide/assault injuries. When hospitalized for severe trauma at the Phoenix Indian Medical Center (PIMC), urban Indians had a higher incidence for poisoning causes than rural Indians. Rural Indians had higher overall admission rates (29.7 vs. 17.2 / 1,000 pop.) than urban Indians. Rural Indians were more frequently hospitalized for motor vehicle, falls, suicide/self-inflicted and homicide/assault injuries.

2. Hospitalization for severe trauma at non-federal hospitals:

There were Maricopa County Native Americans discharged from 30 other hospitals in Arizona during 1995/96. 95% of these hospitalizations occurred in 11 non-federal hospitals, excluding PIMC. Maricopa county rural Indians had a total incidence rate of hospitalization that was 15 times greater than urban Indians (26.3. vs 1.75 / 1,000). For severe trauma, rural Indians had a higher hospitalization rate per 1,000 population than urban Indians in all E-Code

categories (E800-E999). Rural Indians were three times more likely to be discharged for intentional injuries (E950-E978). The outcome of hospitalization after severe trauma was poorer for rural Indians than urban. Rural Indians had higher rates per population for transfer to another health care institution, including transfers to skilled nursing facilities, intermediate care facilities and other organized convalescence homes, and they expired from traumatic injuries at twice the rate of urban Indians.

3. Cost of hospitalization from severe trauma:

973 cases of severe trauma resulted in $20,828,534 in hospitalization charges from the non-federal healthcare facilities. Overall, those injured suffered 5,720 total inpatient days, and average length of stay of 5.9 days, and an average cost per day of $3, 641.35. Urban Indians had higher costs associated with their hospitalizations due to a higher number of discharges.(Table 1) The three leading causes of hospitalization for all Native Americans included motor-vehicle traffic injuries, homicide/assault, and injuries from falls. Hospitalization payment sources used by Native Americans in Arizona included: AHCCCS/Medicaid (52%), Medicare (11%), HMO/PPO (15%), Commercial Indemnity (5%), Self-Pay (4%), Children's Rehab services (2%), Workers Compensation (1%), Champus (0.3%) and Charity (0.2%).(Table 2) For all Native Americans in Maricopa County, the eight leading causes of hospitalization for severe trauma were motor vehicle, assault, falls, other accidents, undetermined, poisoning by drug, poisoning by solid/liquid, and natural causes/environmental factors.

4. Injury-related intentional and non-intentional deaths:

Death certificates were studied to learn which injuries contributed to Native American (NA) mortality. Crude death rates per 100,000 were calculated based on place of residence. Comparisons to US (all races), AZ (all races), County (all races), and Native American (AZ only) were made which revealed that rural NA's had the highest crude death rates across all injury groups, and greatly exceeded the death rates of US, State, and All other Native Americans residing in Arizona. Rural Indians exceeded urban crude death rates/100,000 (303.4 vs 197.9). Rural Phoenix Indians had a much higher death rate from motor vehicles injuries than urban Indians (5 times greater than the US-White population). Indians residing in Phoenix had higher rates than White, Black, Asian, or other Native Americans in Arizona. The same was true when deaths were adjusted for age (181 VS 106). Age-adjusted death rates by race and sex revealed that males were 3 times more likely to die from severe trauma than were females. For all Native Americans in Maricopa County, the eight leading causes of death were motor vehicle, homicide, suicide, falls, poisoning by drug, poisoning by solid/liquid, submersion/suffocation, and other accidents.

5. Urban/rural comparisons of violent crime:

Native Americans residing in Maricopa county have a measurably higher violent crime (murder, manslaughter, and aggravated assault) and sexual assault (rape and molestation of a minor) rate per 1,000 population than Native American communities residing outside of Maricopa county. Native Americans residing on federally recognized reservations within Maricopa had much higher rates than other reservation residents within the State of Arizona. The Maricopa reservation Indian violent-crime rate/1,000 populaton was 2.14 compared to 0.37 for Non-Maricopa county Indians. For sexual assault the same trend was present with the Maricopa reservation Indians having a rate of 3.21 to Non-Maricopa reservation Indians rate of 0.99/1,000 population.

6. Injury Outcome Ratio (Injury Triangle):

For general comparative purposes, a metropolitan Phoenix Indian-injury triangle was estimated to reflect the ratio of outpatient visits to inpatient hospital stays and deaths resulting from traumatic injuries among Native Americans, and to compare this to the US (all race) injury triangle. This type of descriptive demographics may reveal the level of access any community may have to healthcare. Greater access might allow for better health outcomes. This study showed that for every traumatic injury death more Native Americans were hospitalized than the general US population. For outpatient visits, the general US population had the greatest access to healthcare. Urban Native Americans in Phoenix had more access and rural Indians had the least.

Significance of this research:

Injury literature on urban Indians and urban/rural comparison is scarce. No previously published population-based, comparative-injury study has been conducted in the Phoenix metropolitan area. A comparison of the injury information available from federal (IHS) healthcare facilities with that available from non-federal healthcare systems (state databases) reveals that IHS injury and cost data are greatly underestimated. This was the first IHS study conducted to capture injury information from the State of Arizona, and the first to capture the nature of payment mechanisms for non-federal hospitalizations of Native Americans. There is measurable benefit to be gained from a cooperative epidemiological data-sharing approach between the Indian Health Service and a local State Health Department. This study also provides the first community-based reference point upon which to target additional surveillance activities in the Phoenix IHS Service Unit and from which to design and evaluate the effectiveness of future injury reduction interventions in urban Native American communities in Arizona.

Conclusions:

Nearly 70% of the Native Americans receiving health care in the greater Phoenix area reside off reservation in urban communities. This research identified their risks from intentional and unintentional injury and death. Urban Indians in this study showed different rates for motor vehicle accidents, pedal cycle injuries, poisoning, fire/thermal injuries, submersion accidents, self-inflicted/suicide and homicide/assault than did rural Indians. Urban Indians had higher violent and sexual crimes than rural Indians. Urban Indians had more frequent ambulatory visits to healthcare facilities. The cost of urban injuries has been underestimated. IHS cost data captures only a fraction of the total cost of injuries to Native Americans as revealed by the comparative data contained in State Health Department record systems.

Although limited to a study of Native peoples in Maricopa County, Arizona, this research is similar to other published and unpublished injury epidemiological research conducted in the other states. These studies reveal that urban Indians have different injury patterns than rural Indians and that rural Indians in general suffer higher rates of injury incidence, more severe injuries, and the highest rates of injury-related death. Rural Indians suffer a poorer outcome from traumatic injuries and have higher injury incidence rates and death rates than urban Indians. This study substantiates that there is a continuum of injury severity and death among Native Americans in that the closer to an urban community a Native American resides the lower are their incidence rates and death rates from traumatic injuries. As one progresses from urban to semi-rural the rates increase, and in very rural communities they are the highest.

Table 1: Injury costs: 4 leading E-codes. 1995/96 PIMC CHS Charges (227 injuries).

E-code group	Urban	Rural
Motor vehicle	$2,155,330	$531,457
Accidental falls	$187,015	$117,792
Suicide/self-inflicted	$32,924	$47,796
Homicide/assault	$132,577	$1,109,269
Total charges	$3,211,719	$2,387,343
Avg. charge/day	$4,874	$4,852

Table 2: Payment Sources for injury cases. 1995/96 non-Federal inpatient discharges.

	# / %	Charges	ALOS	Cost/Day
Arizona AHCSS	537/64	$13,242,542	6.7	$3,687
Private Insurance	191/20	$4,165,377	6.5	$3.378
Other	69/7	$1,374,237	6.3	$3,144
Children's Rehab Svcs	5/2	$351,074	9.4	$7,470
IHS	58/3	$575,696	2.1	$4,719
Self-pay	84/4	$818,108	2.6	$3,770
Workers Compensation	19/1	$251,950	3.3	$4,064
Charity	3/0.2	$39,550	3.3	$3,955